WAR FOOD ADMINISTRATION
OFFICE OF DISTRIBUTION
Washington 25, D. C.

August 1944

The attached material supplements Miscellaneous Publication No. 544, "Community Canning Centers," issued by the Office of Distribution, War Food Administration, April 1944. It has been prepared under the direction of the Office of Distribution in cooperation with the Extension Service, Office of Education, Bureau of Human Nutrition and Home Economics, and the National Canners Association in response to the need for some revisions of the publication as well as for additional material. No attempt will be made at this time to duplicate this material for distribution to community canning centers. However, each agency or group using it may duplicate and distribute it according to its own needs.

TABLE 8, TIME AND TEMPERATURE FOR CANNING SPECIFIED PRODUCTS, (REVISED)

This revised table replaces table 8 on page 75 of Miscellaneous Publication No. 544, "Community Canning Centers."

(1) Center can temperatures at closure

The revised table includes a change in the center can temperature given at closure, as well as additional information on the initial temperatures for some products. The changes made in the center can temperatures for various products while somewhat lower than those formerly given in table 8 are higher than those used commercially and are recommended for community canning because of the cooling which occurs through the steps of removing the products from the hot water exhaust to sealing and processing them. The higher center can temperature is necessary to allow for this cooling.

However, the time necessary to reach recommended exhaust temperatures should not be more than 10 minutes for fruits and vegetables if exhaust boxes are adequately heated. Many of the failures to secure center can temperatures come from poor construction or insufficient heating of exhaust boxes. Under no circumstances should canning procedures be made to fit poor equipment but rather the equipment should be corrected so that satisfactory canning procedures may be used.

Closing temperatures should be checked occasionally during sealing for assurance that the desired center can temperature is maintained. Products packed in brine such as snap beans, peas, etc., should have an average temperature of at least 130° F. at closing if the desired vacuum is to be obtained. A center can temperature higher than 130° F. is necessary to maintain that average temperature throughout the sealing operation.

The experience of supervisors in making such checks has indicated that higher center can temperatures are necessary for community canning centers than would be used when fewer products are being canned and more adequate equipment is being used.

(2) Initial temperature

Where initial temperature is indicated as an essential part of the process, it is imperative that exhausted cans be sealed with all possible speed and placed in heated retorts soon after sealing. Initial temperature is the temperature at the center of the can at the time the processing is started. Where initial temperature is designated, the coldest can in the retort load should not have a lower center can temperature than that recommended. To check the initial temperature, place thermometers in the first two cans that come from the exhaust box and put on the covers but do not seal. When all cans for that batch have been sealed and placed in the retort, the center temperature of the cans set aside will indicate the initial temperature.

PRESSURE COOLING

Attention is called to the fact that while the time and temperature tables for canning in No. 10 cans were included in Miscellaneous Publication No. 544, no attempt was made at that time to include information on pressure cooling of nonacid products canned under pressure. The cooling instructions given on each canning sheet apply only to those products canned in the smaller containers except No. 10 tins. All nonacid products canned in larger than No. 3 cans must be cooled under pressure.

The attached instructions on pressure cooling installation may need to be modified somewhat to meet local conditions and should in all instances be adapted to meet local and State laws governing such installations. The instructions on how to cool under pressure apply only to cooling wherein the pressure is maintained with steam.

CANNING INSTRUCTIONS

Canning instructions for a variety of acid and nonacid products other than those in Miscellaneous Publication 544 are attached and include: baked beans; greens; mixed vegetables for soup or salad; okra; peppers (pimientos); pineapple; pumpkin and squash; sauerkraut; summer squash; sweetpotatoes in sirup or brine; sweetpotatoes, solid pack; and tomato juice. The preparation instructions, while based on those used by commercial canners, have been adapted to fit community canning conditions. Initial temperatures have been added where they influence the processing time of the product.

The time and temperature tables are those developed by the National Canners Association. In using these processes it must be kept in mind that they are designed for use in commerical plants where the quality of the product canned, the equipment used, the plant sanitation,

and supervision are carefully controlled. The processes are adequate for community canneries where conditions of operation and supervision meet the standards that have been suggested. Where there is any question of existing conditions or standards, 5 minutes should be added to each processing period as a safety factor.

INSTRUCTIONS FOR CANNING TOMATOES (REVISED)

The attached sheet on canning tomatoes is issued as a correction of the error in processing time given for No. 2 and No. $2\frac{1}{2}$ cans in Miscellaneous Publication No. 544, page 82. The time now given is in accordance with that recommended by the National Canners Association.

USE OF CALCIUM CHLORIDE IN CANNING WHOLE TOMATOES

Instructions for the use of calcium chloride in canning whole tomatoes have been added in response to requests, particularly those from the Southern States where difficulty has been experienced in obtaining a satisfactory texture in this product.

Attachments (16)

Table 8. - Time and temperature for canning specified products
Revised August 1944
(Minimum center temperatures for community cannery use)

Product	Type of can	Minimum center temperature	Initial temperature	Time to process in boiling water (212° F.) Size of cans No. 2	No. $2\frac{1}{2}$ or 3	No.10
		° F.	° F.	Minutes		
Acid foods						
Applesause	Plain-L	180	--	10	15	20
Apricots	Plain-L	160	--	15	20	25
Berries	R-enamel	170	--	10	15	25
Cherries, red	R-enamel	170	--	15	20	30
Cherries, Royal Anne	Plain-L	170	--	15	20	30
Peaches, freestone	Plain-L or M	160	--	20	25	40
Peaches, cling	Plain-L or M	160	--	25	30	45
Pears	Plain-L or M	160	--	20	25	35
Pineapple	Plain-L	170	--	20	25	--
Sauerkraut	Plain-L	150	--	15	20	30
				Water-cooled tomatoes		
Tomatoes	Plain or	140	--	45	55	90
				Air-cooled tomatoes		
Tomatoes	R-enamel	140	--	35	45	70
				Water-cooled tomato juice		
Tomato juice	Plain or	190	--	30	35	--
				Air-cooled tomato juice		
Tomato juice	R-enamel	190	--	20	25	--
				Time to process at 230° F. (6 lbs. pressure)		
				Minutes		
Peppers, pimiento	Plain-M	150	--	50	--	--

Table 8. - Time and temperature for canning specified products
Revised August 1944-Continued
(Minimum center temperatures for community cannery use)

Product	Type of can	Minimum center temperature	Initial temperature	Time to process at 240° F. (10 lbs. pressure)		
				Size of cans		
				No. 2	No. 2½ or 3	No.10
		° F.	° F.	Minutes		
Nonacid foods						
Asparagus, spears	Plain-M	140	—	26	26	35
Beans, baked	Plain-M	150	140	95	115	—
Beans, baked	Plain-M	190	180	80	95	—
Beans, green & wax	Plain-M	140	—	20	25	35
Beans, green lima	C-enamel	140	—	35	40	55
Beets, whole	R-enamel	160	—	30	30	40
Carrots	C-enamel	160	—	30	30	40
Corn, cream style	C-enamel	185	180	90	—	—
Corn, whole grain	C-enamel	185	—	50	—	—
Mixed vegetables	Plain-M	150	—	35	45	—
Okra	Plain-M	150	—	17	20	35
Peas, green	Plain-M	140	—	35	40	55
Pumpkin-squash	R-enamel	190	180	70	95	190
Pumpkin-squash	R-enamel	170	160	80	105	210
Summer squash	Plain-M	150	—	40	—	—
Sweetpotatoes, in sirup or brine	R-enamel	170	—	45	50	—
Sweetpotatoes, solid pack	R-enamel	160	150	95	110	—
	or plain	190	180	85	95	—
				Time to process at 250° F. (16 lbs. pressure)		
				Minutes		
Greens	Plain-M	150	140	45	50	60

WAR FOOD ADMINISTRATION
OFFICE OF DISTRIBUTION
Washington 25, D.C.

August 1944

Pressure Cooling Cans in Small-Sized Retorts Used in Community Canning Centers (Pressure maintained with steam)

Cans of larger diameters, such as No. 5 and No. 10, if processed under pressure, must be cooled under pressure. Otherwise, the ends of the can may buckle when the steam pressure is permitted to drop after the cooking is completed. This buckling is caused by excessive pressure inside the can as opposed to the lower atmopheric pressure outside the can. Such excessive pressure, in addition to disfiguring the can, may overstrain the double seam and cause spoilage owing to leakage. This pressure differential can be reduced only by lowering the temperature of the can contents before the pressure in the retort is permitted to drop. If buckling is experienced in cans of smaller diameter (such as No. 2, No. 2½, and No. 3), processed under pressure, they should also be cooled under pressure.

Pressure cooling may be accomplished by maintaining the pressure either with steam or compressed air. Where compressed air is available the use of this method is more desirable. However, since most community canneries will of necessity be limited to the method wherein the pressure is maintained with steam during part of the cooling period, we are giving instructions for that method.

The attached sketch illustrates a typical retort installation, with minimum pipe connections to permit pressure cooling, wherein the pressure is maintained with steam. Although the exact placement in the piping may vary according to the arrangement of the retort, the size and general locations of the various inlets and outlets should be followed.

The water and steam lines to small-sized retorts may vary from 1/2 inch to 3/4 inch, according to the manufacturer's instructions. The water pressure in the water line should be at least 10 pounds greater than the pressure used in cooking. The bottom steam and water inlets should be connected through the same line to facilitate pressure cooling. Where possible, they should be connected about 3 feet from the retort. The water and steam inlet pipes should be perforated and should cross at right angles as near the bottom of the retort as possible. The perforations should be directed upward. The retort crate should not rest directly on the perforated pipes but should be supported by metal brackets or wooden blocks of sufficient height to clear the pipes and allow for a free flow of steam and water. Where the height of the retort crate does not permit this installation and it is necessary to bring the steam and water through the pipe at the center bottom of the retort, greater care will need to be exercised when starting pressure cooling operations.

The drain line should be not less than 1 inch and preferably 1½ inches in diameter and should be connected to a sewer or attached to a discharge pipe leading to a drain pit. Where the overflow pipe is to be used for venting, the drain should have a minimum diameter of 1½ inches and, if the drain line is more than a few feet, 2 inches would be advisable. Although the drawing illustrates a separate pipe at the bottom of the retort leading to the drain line, the water and steam inlet pipe is often used for the drain where only one pipe connection has been provided. This necessitates a "T" installation connecting the drain with the steam and water inlet.

The overflow pipe should not be less than 1 inch in diameter and should be connected with the drain pipe. The overflow pipe should be broken at "F" to prevent a vacuum from being drawn in the retort and to permit ready inspection of the amount of water passing out. All pipes should be reamed in order that full capacity is available. They should also be blown out to remove particles that may cause the valve seats to become scored. Where the overflow is used as a vent the valve "E" should be a gate valve, as is shown in the diagram attached. A globe valve is not recommended because the resistance to air flow of a globe valve is about 50 times that of a gate valve and its use would greatly reduce venting efficiency.

A pressure reducing valve of the same size as the pipe used should be installed in the main steam line to the retorts. The pressure-reducing valve should be set at approximately 5 to 10 pounds higher than the pressure at which the retorts are operated. The safety valve installed between the pressure-reducing valve and the retorts should be set slightly higher than the pressure-reducing valve. This is a safeguard against the failure of the pressure-reducing valve. Each retort should be protected by a safety valve of at least equal size to the steam supply pipe line between the steam supply valve and the retort and should be set at a pressure 2 to 5 pounds greater than that at which the retort is to be operated.

A pet cock or bleeder of not less than 1/8 inch internal diameter and preferably 3/8 inch to 1/2 inch should be provided in the lid of the retort and on the thermometer well. Both should be kept open until the vent valve "E" has been closed, then they should be partially closed so that approximately half the flow of steam is emitted. The pet cocks or bleeders, the vent, and the safety valve should be turned in such a way that steam is never directed toward the operator. It may be well to provide a shield on the safety valve so that persons near the retort would not be burned by steam or hot water if the valve opened to release pressure.

The mercury thermometer is the official instrument by which the cooking is done. Such a thermometer should not have more than 16-degrees-to-the-inch scale which would require approximately a 7-inch length. The thermometer should have a scale reading from 170° F. to 270° F. The

temperature range should not be more than 100° F. and the scale divisions should be either 1 degree or 2 degrees each—never greater than 2 degrees. The thermometer installed in the side of the retort in a position convenient for reading, is set in a well and should be equipped with a 1/8-inch pet cock or bleeder. This permits the flow of steam past the thermometer bulb throughout the processing period and assures an accurate reading.

A pressure gage should be installed in the lid of the retort in an approved manner and in a position convenient to read. It should be graduated in 1 pound divisions and should have a range of 30 pounds.. The gage, with a minimum 3-inch and preferably 5-inch dial, should be of a type in which the operating mechanism is independent of the case. The pressure gage and thermometer should be tested for accuracy before processing is started..

In the arrangement of fittings and connections shown on the attached drawings some modifications may be necessary to meet local conditions. However, valves A, B, C, and E should be so located that each may be readily reached and will permit the operator to watch the pressure gage and thermometer. In community canneries, w here retorts are used but seasonally, all valves should be gone over before the canning season starts to see that they seat properly and operate freely. The retorts should be thoroughly cleaned with a wire brush to prevent loose scale or rust from getting into the valves during operation. The retort is equipped with a gasket in the flange of the retort or in the retort lid for the purpose of making a seal between the lid and retort flange. This gasket must be maintained in good condition. It should be treated at frequent intervals with a solution of graphite and oil. This prevents it from sticking and helps to make a good seal. When the gasket becomes worn it should be replaced. An extra gasket should be on hand for this purpose.

Retort Operation (For more detailed information on retort operation see Miscellaneous Publication 544, Community Canning Centers, Pages 47-50.)

1. Where the steam and water line are connected 3 feet from the retort, start operations with a dry retort. The steam and water, connected through the same line, flow together through 3 feet of pipe so that steam will have a chance to condense and warm the water when starting the pressure-cooling operations. Where the steam and water juncture is less than 3 feet from the retort, it will be necessary to start operations with a cushion of water in the retort to prevent condensation of steam when cold water is admitted at the beginning of pressure cooling. In the latter case, before putting the filled basket into the retorts, admit 6 to 8 inches of water and turn in the steam to bring it to the boiling point.

2. After the filled basket is placed in the retort, the lid is adjusted into position. The proper position is indicated by marks on the lid and the retort, which should always be in perfect alinement to prevent wear on the gaskets.

3. Lift all lugs into place. Do not tighten any until they are all up. This insures that all lugs can be raised into position. Fasten lugs by hand until tight. Turn opposite lugs—do not start at one point and go around the lid because this will put a strain on the lid. Furthermore, some lugs may loosen when the pressure builds up in the retort.

4. Make certain water inlet, valve "C," and top steam inlet, valve "A," are closed. Close drain valve "D." To vent the retort completely open gate valve "E," top pet cock bleeder, and bleeder on the thermometer, and leave open throughout the venting period. The time required for venting will vary with the type and size of retort used and should be predetermined for each retort before processing is begun. A minimum venting time of 5 minutes is suggested as a guide. Venting should be continued until a termperature, by the mercury thermometer, of at least 212° F. has been reached. If this temperature is reached in less than 5 minutes, the vent should be left open for the additional time required even though the temperature may rise to 215° F. or 220° F. or higher. Some retorts may require more than 5 minutes.

5. Open bottom steam valve "B" gradually while at the same time watching the boiler pressure so that it does not get too low. Be patient because a certain amount of time is required to bring up a retort. The limit to which pressure may be permitted to descend without risk will depend upon the size of the boiler and the amount of steam equipment that may be in operation at the same time. Fifteen or 20 h.p. boilers may be allowed to fall to as low as 25 or 30 pounds without much danger, while smaller boilers should not be allowed to go below 40 pounds. Where the boiler capacity is known to be low, careful check should be made against an excessive amount of steam equipment being used at any one time.

6. At the end of the venting period when the mercury thermometer indicates a temperature of 212° F., the gate valve "E" should be closed completely. The top pet cock and thermometer bleeder should be only partially closed so that approximately half of the full flow of steam is emitted. They are left in this position throughout the entire processing period, thus permitting the essential circulation of steam through the retort and past the thermometer bulb.

7. As soon as the mercury thermometer indicates the processing temperature desired, check the gage and thermometer for temperature-pressure agreement (See table 7, page 74, Miscellaneous Publication 544). A disagreement between temperature and pressure indicates insufficient venting. In that case venting should be continued until an agreement is reached. Record the time up and determine the time the cooking will be completed. The correct temperature in the retort is maintained by regulating steam inlet valve "B."

Pressure Cooling

At the end of the processing period, the following points should be observed for pressure-cooling all large diameter cans, and small sizes where necessary:

Open the steam valve "B" an additional quarter turn or more to build up the pressure slightly above operating pressure. Give water inlet valve "C" about 1/4 turn. Let stand a few minutes and repeat until a full flow of water is coming into the retort. It is extremely important at all times that the water be admitted to the retort gradually and particularly so where the water pressure at the retort is in excess of 50 pounds. It is also important that water be admitted to the retort gradually and with extreme care where the "T" arrangement of perforated pipes has not been provided in the bottom of the retort and the steam and water are admitted directly through the center pipe as is illustrated in the drawing.

Continue admitting steam and water together until there is a layer of several inches of hot water in the retort. (This can be determined only by practice and will usually require 2 or 3 minutes.)

As the layer of hot water builds up, turn off the lower steam valve "E" gradually until it is completely closed and cold water is being admitted under the layer of hot water. (This layer of hot water prevents the steam in the top of the retort from condensing and thus makes it possible to maintain a pressure on cans.)

The pressure should be held at or above the normal operating pressure. This is accomplished by opening the top steam inlet valve "A" as the bottom steam valve "E" is closed.

As the retort fills with water, there will be little use for steam to hold the pressure because it will be maintained by the water pressure. However, continued observation and adjustment of valve "A" will be necessary. When the water level reaches the pet cock bleeder on the thermometer it should be closed and valve "A," top steam inlet, should be closed. It will be noted that the mercury column of the thermometer drops rapidly. When retort is about full the water will shoot out of the pet cock bleeder on the retort lid. Close this top bleeder, and at once partially open the overflow valve "E" and cut back the flow of water by partially closing valve "C." The retort pressure should be kept the same as, or slightly higher than, the cooking pressure during these operations, care being taken that the pressure never exceeds the processing pressure by more than 5 pounds. Adjust the water inlet valve "C" and the overflow valve "E" so as to maintain the desired flow of water through the retort at the desired pressure. With practice one can soon learn the exact method of handling valves during this stage.

Great care must be exercised to prevent excessive pressure as the retort fills with water. The retort operator must make every effort to keep the pressure constant. Practice with empty retort until details are mastered. When the retort has filled with water it should be held at the normal operating pressure and the water allowed to run through the retort freely until the cans have been cooled, so that when the water pressure on the retort is relieved the cans will have no more internal pressure than is displayed by a "springer." Because the top row of cans cool more slowly than the other rows, observation should be made on these and determinations set up for each product as a guide for cooling time required. Products such as peas, string beans, beets, and carrots, which heat by convection, will cool rapidly and will require but very short holding periods under pressure after the retort is full of water. There will be cold water circulating in through the bottom and hot water out through the overflow. When the water flowing out of the overflow pipe is cool enough so that the hand may be held on the pipe, the pressure may be dropped and the retort lid removed. This should be done gradually at the rate of 1 pound per minute until 0 gage pressure has been reached. This is accomplished by opening the overflow valve "E" until all the pressure is out of the retort. When this occurs the water inlet valve may be closed tightly and the lid removed. Cooling should be continued after the lid is removed by maintaining the above-mentioned circulation until the cans are just warm when placed to the cheek. Other products which heat by conduction, such as pumpkin, cream-style corn,etc. will require longer periods for cooling under pressure. This period may vary from 20 to 25 minutes. When such products are cooled the retort should be held at full pressure to within 10 minutes of the end of the cooling period and then the pressure be dropped at the rate indicated. It is best to drain the retort before the cans are removed to prevent spilling water on the floor. In pressure-cooling the following rules should be observed:

1. Keep valves well oiled so that they work freely.

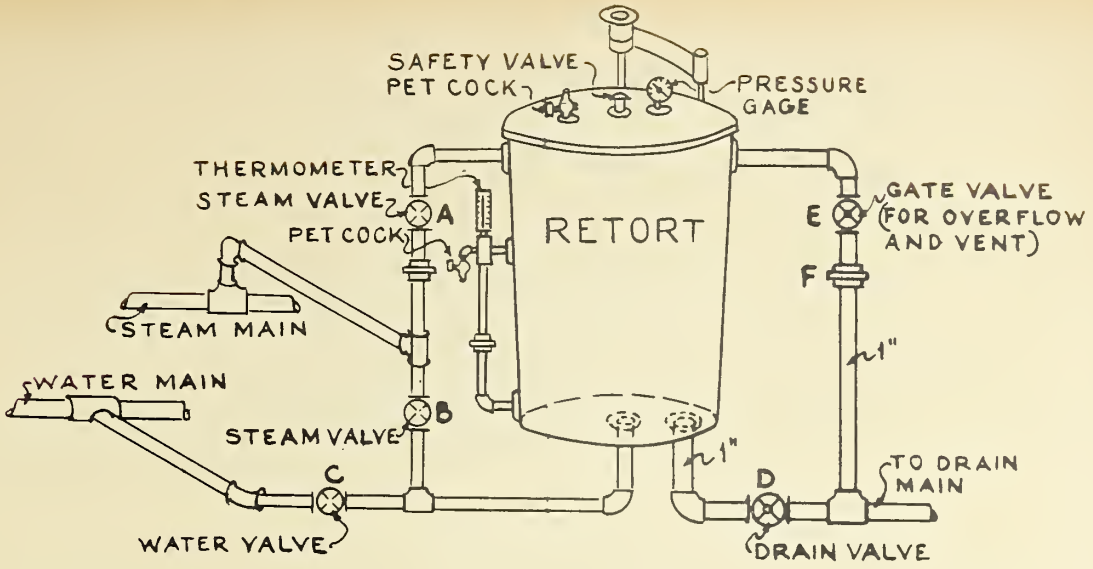
2. Fill retort full of water as rapidly as possible to prevent overcooking top cans. Cut back the flow of water as soon as retort is sufficiently filled to cool cans in desired time.

3. Maintain a constant pressure in retort while it is being filled with water. Slowly reduce pressure thereafter.

4. To prevent buckling of cans and overstraining of seams do not relieve retort pressure too abruptly.

5. To prevent paneling at sides of cans do not cool too long under pressure.

6. Observe the top cans for the effects of too-short cooling under pressure and the bottom cans for the effects of too-long cooling or too much pressure during the later stages. Too great a differential between the results on top and bottom cans may indicate that the retort has been too slow in filling or that too small a flow of water has been going through while cooling.

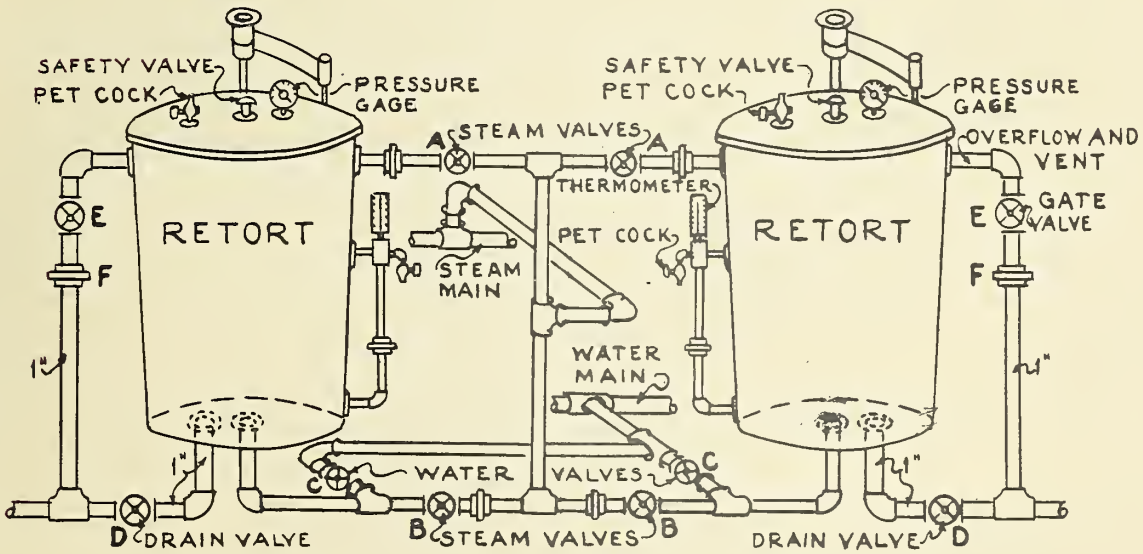


NOTES.— STEAM-AND WATER-PIPE SIZES TO BE $\frac{1}{2}$" OR $\frac{3}{4}$", ACCORDING TO THE RETORT MANUFACTURER'S RECOMMENDATION.

SEE FIGURES 2 AND 3 FOR MINIMUM SPACE REQUIRED FOR RETORT ASSEMBLY. SPACE SHOWN IS EXTENDED TO ILLUSTRATE THE PIPING AND FITTINGS.

PROVIDE A SAFETY VALVE NEAR THE PRESSURE REDUCING VALVE IN THE MAIN STEAM LINE.

Figure 1.--Diagram of piping arrangement to single retort for processing and pressure cooling.



NOTES.- STEAM-AND WATER-PIPE SIZES TO BE $\frac{1}{2}$" OR $\frac{3}{4}$", ACCORDING TO THE RETORT MANUFACTURER'S RECOMMENDATION.

SPACE BETWEEN RETORTS OF 106 NO.3 CAN CAPACITY EACH SHOULD BE 30" MINIMUM TO ALLOW FOR THE PIPING AND FITTINGS. SPACE SHOWN IS EXTENDED TO ILLUSTRATE THE PIPING AND FITTINGS ASSEMBLY.

PROVIDE A SAFETY VALVE NEAR THE PRESSURE REDUCING VALVE IN THE MAIN STEAM LINE.

Figure 2.--Diagram of piping arrangement to retorts in pairs for processing and pressure cooling.

WAR FOOD ADMINISTRATION
OFFICE OF DISTRIBUTION
Washington 25, D. C.

August 1944

Use of Calcium Chloride in Canning Whole Tomatoes

A firm texture is one of the objectives to good quality in canned whole tomatoes. Many localities, particularly in the Southern States, are having difficulty in obtaining a satisfactory texture in this product.

The addition of calcium chloride to tomatoes at the time the cans are filled has been found to be a satisfactory method of retaining firmness in the canned product. The most satisfactory method of using Ca Cl is by placing a tablet in the can before filling or by adding the solution to the tomatoes at the time the can is filled.

Another method that is used is to dip the tomatoes into a Ca Cl solution after peeling and before packing. This method probably would not be desirable for use in community canneries since the concentration of the solution must be kept constant and the time of dipping depends on the percentage of Ca Cl used.

The most convenient use of Ca Cl for community canneries probably would be by addition of tablets at the time tomatoes are filled into cans. The salt tablets containing Ca Cl in the desired concentration may be obtained for use in canning tomatoes in various sizes of cans. There is no difficulty in securing uniformity in the firmness of canned tomatoes when these tablets are used. The tablets are used as follows:

No. 2 cans - 6 grains
No. 2½ cans- 9 grains
No. 3 cans - 9 grains
No. 10 cans- 15 grains

The disadvantage of these tablets is their tendency to dissolve when exposed to the humid air of the cannery. They must be kept in moisture-proof containers and removed only as needed for immediate use.

The second method of using Ca Cl that is applicable to community canning is the addition of the solution to tomatoes after filling into cans. Only U. S. pure Ca Cl should be used in making the solution, which contains 1 pound 7 ounces of Ca Cl in 10 gallons of water. This solution is used as follows:

No. 2 cans	-	1 ounce
No. 2½ cans	-	1.5 ounces
No. 3 cans	-	1.5 ounces
No. 10 cans	-	5.25 ounces

Although there is more difficulty in obtaining accurate measurements in the use of the solution, the results in the finished product are approximately the same as when tablets are used. With either method the quality of whole canned tomatoes is improved with respect to texture and may be used with safety from a health standpoint.

WAR FOOD ADMINISTRATION
OFFICE OF DISTRIBUTION
Washington 25, D.C.

August 1944

BAKED BEANS

Container: Use plain tin cans.

Quality of product: Beans for canning should be of choice grade and free from mold, disease, discoloration, or other defect. Mold gives a musty odor and flavor to canned beans. It may be detected by pouring boiling water over the beans when the odor is immediately apparent. Beans that have been frosted have a darkened color when soaked and cause an objectionable flavor and color in the canned beans.

Preparation: Sort to remove all defective beans and stones or other refuse. Freshly picked beans may be steamed without soaking but dried beans should be soaked 12 to 16 hours before further preparation. Glass, stone, or metal containers may be used for soaking beans. Use of wooden tanks may cause moldy or soured beans. Water for soaking should not be excessively hard and should be changed during the soaking period if the temperature is warm enough to cause souring of the beans. Water that is too hard causes beans to be hardened or tough.

Rinse soaked beans in fresh water and blanch in hot water for 3 minutes. Sort to remove split or defective beans. The blanched beans may be packed at once with tomato sauce or may be baked before canning.

Beans with Tomato Sauce: Fill the blanched beans into cans leaving 1/2 inch headspace. Tomato sauce made as follows or with the seasoning changed to suit individual taste, may be added to the beans:

25 gallons tomato pulp
1/2 gallon 100-grain white vinegar
2½ cups chopped onion
1/3 cup chopped garlic
18 pounds sugar
6 pounds salt
1½ ounce cinnamon
1 ounce cloves
1 ounce allspice
1 ounce cayenne
1/2 ounce mace

Use sound, ripe tomatoes for making the sauce. Cook all ingredients together and reduce to one-half the original volume before using.

Filling: Cover blanched beans completely with boiling tomato sauce and exhaust at once.

Baked Beans: Fill the blanched beans into bean pots or baking pans, placing 1/2 pound of salt pork in each 2-quart pot. Sauce made as follows or with the seasoning varied to suit individual taste, may be used for each 2-quart pot of beans:

2 teaspoons salt
3/4 teaspoon ground mustard
3 tablespoons dark molasses
1 tablespoon vinegar (45-grain cider)
1 quart warm water

Add the sauce to the blanched beans with enough hot water just to cover the beans. Bake 5 to 6 hours at 350° F., or place in kettles that fit inside the retort and steam at 250° F. for 20 to 45 minutes, depending on the softness of the beans.

Filling: Fill hot baked beans into cans, adding a portion of the salt pork to each can. Fill to within 1/8 inch of the top of cans and exhaust at once.

Exhausting: Because of the slow heating of canned beans, a long exhaust is necessary if beans cool considerably before sealing and processing. An initial temperature of at least 140° F. is necessary and the exhaust should give a center can temperature sufficiently high to maintain the desired initial temperature. An initial temperature of 180° F. is preferred as the processing time may be appreciably reduced.

Processing: Process baked beans at 240° F., as follows:

	140° F. Initial Temperature	180° F Initial Temperature
No. 2 cans	95 minutes	80 minutes
No. 2½ cans	115 minutes	95 minutes
No. 3 cans	115 minutes	95 minutes

Note: Since baked beans heat by conduction the initial temperature is an essential part of the process. Set aside the first can to be sealed and put a lid on it but do not seal it. When the retort load is ready for processing take the center temperature of the can set aside. This rep resents the initial temperature, presumably, of the coolest can of the load. When the initial temperature is not sufficiently high the processes given may not be adequate.

Cooling: Immediately after processing is completed cool cans as rapidly as possible to 100° F. This leaves enough heat in the cans to dry them and prevent rusting. When the cans are removed from the cooling water they should be tilted to drain off excess water and then should be stacked in a well-ventilated place until cold. Do not stack cans or place into cartons until they are cold and dry.

WAR FOOD ADMINISTRATION
OFFICE OF DISTRIBUTION
Washington 25, D. C.

August 1944

GREENS

Container: Use plain tin cans.

Quality of Product: Any cultivated or wild greens that are used fresh may be canned. Only young, tender greens should be canned since tough stems lower the flavor and texture and cause slow heat penetration. Use care in ventilation of greens to prevent their heating in harvesting crates.

Preparation: Greens should be sorted and trimmed before washing since they mat and become more difficult to sort when wet. Remove old, discolored or inferior leaves and fibrous stems. Only crisp, fresh greens should be canned. Shake off loose sand in sorting.

Greens must be washed thoroughly and carefully to remove all soil. Use a large volume of water and wash a small enough quantity at one time to avoid matting. A wire rack in the bottom of the washing tank permits sand or dirt to fall to the bottom of the tank and makes washing easier. Several waters are necessary for thorough cleansing of greens. Washing should be continued until the last water is clear and there is no trace of sand in the washing tank.

Blanching: Blanch greens at 190° to 200° F. for 2 to 4 minutes or until a desirable wilt is obtained. Blanching is completed when greens are pliable rather than crisp and are shrunk enough to insure a desirable fill in the cans.

Fill the blanch baskets 1/3 to 1/2 full of greens. Overfilling causes matting which retards circulation of water through the greens and gives an uneven blanch. Move the greens back and forth in the blanching water to aid in removal of gases.

Do not continue blanching longer than is necessary for desirable wilting as overblanching will cause greens to be slimy or mushy.

Filling: Drain greens for a few minutes to remove excess water. Too long draining will result in overpacking of greens. Pack by weight to avoid slack fill or overfilling, which will retard heat penetration and make the recommended time and temperature ineffective.

The maximum fill-in weights given below are recommended but must not be exceeded:

No. 2 cans - 14.5 ounces
No. 2½ cans - 21 ounces
No. 3 cans - 23 ounces
No. 10 cans - 66 ounces

The following minimum fill-in weights are necessary to avoid slack fill:

No. 2 cans - 13 ounces
No. 2½ cans - 19 ounces
No. 3 cans - 21½ ounces
No. 10 cans - 60 ounces

After filling use a pointed stick to push through the center and to the bottom of the filled can to loosen the greens and make it possible for water or brine to reach the bottom of the can. Add a 2 percent brine to completely fill the can, or use boiling water and add 1/2 teaspoon of salt to each No. 2 can or 1 teaspoon of salt to each No. 3 can.

Exhausting: Exhaust to a center temperature of 150° to 160° F. The higher temperature is better if it can be obtained quickly.

Sealing: Seal cans as soon as exhausting is completed. Do not permit cans to cool after exhausting and before processing. An initial temperature of 140° F. is necessary for greens.

Processing: Process greens at 252° F., as follows:

No. 2 cans - 45 minutes
No. 2½ cans - 50 minutes
No. 3 cans - 50 minutes
No. 10 cans - 60 minutes/1

Cooling: Immediately after processing is completed cool cans as rapidly as possible to 100° F. This leaves enough heat in the cans to dry them and prevent rusting. When the cans are removed from the cooling water they should be tilted to drain off excess water and then should be stacked in a well-ventilated place until cold. Do not stack cans or place into cartons until they are cold and dry.

/1 Since greens packed in No. 10 cans tend to stratify in horizontal layers, it is important, to assure proper heat penetration, in order that cans of this size be processed on their sides rather than in a vertical position.

WAR FOOD ADMINISTRATION
OFFICE OF DISTRIBUTION
Washington 25, D.C.

August 1944

SAUERKRAUT

Container: Use plain tin cans, Type L plate.

Quality of Product: Varieties of cabbage should be used that have been found satisfactory for making kraut and that are resistant to yellows or other disease. Late summer or fall cabbage usually is best for kraut. Cabbage heads should be solid, not less than 2 pounds in weight, and free from decay, discoloration, or damage from freezing.

Preparation: Trim heads of cabbage to remove defective leaves or any bruised spots. Remove the outer green leaves. Wash heads thoroughly and drain well. The cabbage may be cored by hand or the cores may be left if shredding equipment is used. Shreds should be cut 1/32 inch in thickness. Long shreds give the sauerkraut the most desirable appearance after curing.

Wooden tanks or barrels made of fir, cypress, or spruce are used for curing kraut. Other kinds of wood or concrete are not desirable for this use. Small amounts may be cured in stone jars. Care should be taken to see that wooden tanks are watertight, as spoilage occurs when there is leakage of brine from the tank. Tanks should be kept filled with clean water for a few days before using. The interior of the tank may be coated with waterproof material if desired. Tanks should be placed inside the building where temperature can be kept constant, since the rate of curing depends upon an even, warm temperature.

The cut cabbage is placed in the tank and salt added at the rate of 2 to 2½ pounds per hundred pounds of cabbage. Less than 2 percent salt may cause kraut to soften but more than 2.5 percent may give a pink color to the fermented kraut. Spread the cabbage in thin layers and scatter salt over it in alternate layers, mixing enough to give an even distribution of salt through the cabbage. Uneven distribution of salt may cause a soft, spotted, or pink product. A good-grade canning salt that is fine grained and free from lumps should be used. The cabbage should be packed firmly into the barrels or tanks by using pressure to pack down closely while filling but taking care not to break the cabbage shreds. In packing cabbage sufficient brine is formed for curing as the salt draws juice from the cabbage. After the tank is filled it is covered with a sterile cloth and a clean wooden cover that is made in sections for convenience in handling. The cover is weighted to bring the brine about 1 inch over the surface of the cabbage. Cast-iron or stone weights may be used, with only enough pressure to keep the brine at the desired level.

The temperature best for the fermentation of cabbage is around 65° F. This gives slower curing but a better flavor than does a higher temperature. A temperature that is too low will cause darkening of kraut during fermentation. About 3 to 4 weeks are necessary for complete curing. Kraut that has been fermented rapidly will be lighter in color than that which is fermented slowly. The scum which forms during fermentation should be removed once or twice a week. Fermentation is completed when the cabbage develops a translucent appearance and the bubbles cease to rise at the sides of the barrel.

Kraut should be removed from curing tanks immediately on completion of curing since it darkens and may acquire an "off" flavor if it is left in tanks without canning or storage. Remove the brine above the head boards, then the cover and cloth. Discard any discolored kraut at the top of the barrel.

Heat kraut in the juice, or in 1.5 percent brine, to 150° to 160° F. before packing into cans. Turn kraut continually with long forks or paddles to assure even heating. Overheating causes kraut to darken.

Filling: Fill to within 1/4 inch of top of cans. Fill cans completely with a 2 to 3 percent brine that has been heated to boiling.

Exhaust: Exhaust if necessary to center can temperature of 150° to 160° F.

Sealing: Seal cans and place at once in open process tanks. Do not permit cans to cool before processing.

Processing: Process kraut in boiling water (212° F.), as follows:

No. 2 cans - 15 minutes
No. 2½ cans - 20 minutes
No. 3 cans - 20 minutes
No. 10 cans - 30 minutes

Cooling: Immediately after processing is completed, cool cans as rapidly as possible to 100° F. This leaves enough heat in the cans to dry them and prevent rusting. When the cans are removed from the cooling water they should be tilted to drain off excess water and then should be stacked in a well-ventilated place until cold. Do not stack cans or place them in cartons until they are cold and dry.

WAR FOOD ADMINISTRATION
OFFICE OF DISTRIBUTION
Washington 25, D.C.

August 1944

MIXED VEGETABLES FOR SOUP OR SALAD

The following vegetables may be canned in any combination desired. No starchy vegetables, such as potato or corn, may be added.

Cut snap beans	Baby lima beans
Cut asparagus	Peas
Cut celery	Carrots

Quality of Product: The same quality is necessary for vegetables used in soups or salads as when they are canned alone. Defective or over-matured vegetables should not be canned for soups.

Preparation: Prepare each vegetable as for canning alone, using care not to hold cut vegetables longer than is necessary, as this will cause discoloration.

Filling: Fill vegetables to within 1/4 inch of tops of cans. Fill cans with boiling brine.

Exhausting: Exhaust to a center can temperature of 150° to 160° F. The higher exhaust temperature is better if it can be obtained quickly.

Sealing: Seal cans immediately after removing them from the exhaust box and place at once in the retort.

Processing: Process mixed vegetables at 240° F., as follows:

No. 2 cans	- 35 minutes
No. 2½ cans	- 45 minutes
No. 3 cans	- 45 minutes

Cooling: Immediately after processing is completed cool the cans as repidly as possible to 100° F. This leaves enough heat in the cans to dry them and prevent rusting. When the cans are removed from the cooling water they should be tilted to drain off excess water and then should be stacked in a well-ventilated place until cold. Do not stack cans or place into cartons until they are cold and dry.

WAR FOOD ADMINISTRATION
OFFICE OF DISTRIBUTION
Washington 25, D.C.

August 1944

OKRA

Container: Use plain cans.

Quality of Product: Okra pods should be canned while they are still soft. The pods should be harvested every 2 or 3 days so they will be tender. Old pods should not be canned but may be dried. The pods may be cut or broken from the stalks. Care should be used to prevent heating of pods during harvesting or storage.

Preparation: Wash okra pods thoroughly by placing them in a wire basket and dipping up and down in water. Do not let okra stand in the water.

Blanch okra from 3 to 4 minutes in water at 190° F. After blanching, the okra should be dipped into cold water and drained immediately. Sort to remove off-colored or damaged pods. Use a sharp knife to remove the stem and tip ends. Stainless steel knives should be used since okra is very readily discolored. Ordinary steel knives have a tendency to discolor the pods at the freshly cut surfaces. Cut pods into lengths of about 3/4 inch.

Filling: As quickly as possible after trimming, pack into the cans to within 1/4 inch of the top. Add boiling brine to completely fill the can.

Exhausting: Exhaust to a center can temperature of 150° to 170° F. The higher exhaust temperature is better if it can be obtained quickly.

Closing: Immediately after exhausting the cans should be sealed for processing and placed at once in the retort.

Processing: Process okra at 240° F., as follows:

No. 2 cans - 17 minutes
No. 2½ cans - 20 minutes
No. 3 cans - 20 minutes
No. 10 cans - 35 minutes

Cooling: Immediately after processing is completed cool cans as rapidly as possible to approximately 100° F. This leaves enough heat in the cans to dry them and prevent rusting. When the cans are removed from the cooling water they should be turned to drain off excess water and then should be stacked in a well-ventilated place until cold. Do not stack cans or place them into cartons until they are cold and dry.

WAR FOOD ADMINISTRATION
OFFICE OF DISTRIBUTION
Washington 25, D.C.

August 1944

PEPPERS (PIMIENTOS)

Container: Use plain tin cans.

Quality of Product: Use large, smooth (not wrinkled), sweet red or green peppers.

Preparation: Peppers can be peeled by heating in a gas flame, roasting in a very hot oven, or immersing for 2 to 3 minutes in hot cooking oil. After the heat treatment immerse the pimientos in cold water and slip off the skins. The stem, core, and seeds should also be removed.

Filling: Fill cans full, add 1 tablespoon of lemon juice to each No. 2 can of green pimientos (it is not necessary to add lemon juice to red pimientos), and fill with boiling water or brine.

Exhausting: Exhaust peppers to a center can temperature of 150° to 160° F. The higher exhaust temperature is better if it can be obtained quickly.

Sealing: Seal cans immediately after removal from exhaust box and place at once in the retort.

Processing: Process peppers at 230° F, as follows:

No. 2 cans - 50 minutes

Cooling: Immediately after processing is completed, cool the cans as rapidly as possible to 100° F. This leaves enough heat in the cans to dry them and prevent rusting. When the cans are removed from the cooling water they should be tilted to drain off excess water, and then stacked in a well-ventilated place until cold. Do not put cans in cartons until they are cold and dry.

WAR FOOD ADMINISTRATION
OFFICE OF DISTRIBUTION
Washington 25, D.C.

August 1944

PINEAPPLE

Container: Use plain tin cans.

Quality of Product: Pineapple should be fully matured when canned. Fruit that has been picked too green will be lacking in flavor. Do not allow fruit to become overripe, as fermentation rapidly sets in and makes the fruit unsuitable for canning.

Preparation: Wash, peel, remove the eyes, and cut out the hard, woody core. For canning, the fruit can be cut in about 1/2-inch slices or into chunks. Pack the pineapple into the cans to 1/4 inch of the top and completely fill the cans with boiling hot sirup. A medium or heavy sirup may be used. The juice which drains from the fruit during preparation may be used in making the sirup.

Exhausting: Exhaust to a center can temperature of 170° to 180° F. The higher temperature is better if it can be reached quickly.

Sealing: Seal cans as soon as the desired temperature is reached. Do not permit cans to cool after exhausting and before processing.

Processing: Process pineapple in boiling water (212° F.), as follows:

No. 2 cans - 20 minutes
No. 2½ cans - 25 minutes
No. 3 cans - 25 minutes

Cooling: Immediately after processing is completed, cool the cans as rapidly as possible to 100° F. This leaves enough heat in the cans to dry them and prevent rusting. When the cans are removed from the cooling water they should be tilted to drain off excess water, and they should then be stacked in a well-ventilated place until cold. Do not put cans in cartons until they are cold and dry.

WAR FOOD ADMINISTRATION
OFFICE OF DISTRIBUTION
Washington 25, D.C.

August 1944

PUMPKIN AND SQUASH

Container: Use R-enamel cans.

Quality of Product: Pumpkin and squash for canning should have firm, dry meat. They should be fully ripened, and of good texture and color. Frosted pumpkin or squash cannot be canned successfully.

Preparation: Wash carefully. Cut open and remove seeds and fiber. Peel and cut into about 1-inch pieces. Steam or cook in boiling water until tender. Drain thoroughly. Put through a sieve to produce a pulp and drain off any excess liquid. Handle the pulp as hot as possible. Place pulp in a kettle and heat to 200° to 212° F.

Filling: Fill cans to within 1/8 inch of the top.

Exhausting: An exhaust is not necessary if cans are sealed at 190° F. after filling; however, if there is any delay, place the cans in the exhaust box before sealing. An initial temperature of 180° F. is desirable.

Sealing: Seal the cans and place at once in the retort. Do not permit cans to cool before processing.

Processing: Process pumpkin or squash at 240° F., as follows:

	180° F. Initial Temperature	160° F. Initial Temperature
No. 2 cans	70 minutes	80 minutes
No. 2½ cans	95 minutes	105 minutes
No. 3 cans	95 minutes	105 minutes
No. 10 cans	190 minutes	210 minutes

Note: Since pumpkin and squash heat by conduction the initial temperature is an essential part of the process. A minimum of 160° F. must be observed. Set aside the first can filled, and put a lid on it but do not seal it. When the retort load is ready for processing take the temperature at the center of the can set aside. This represents the initial temperature of presumably the coolest can of the load. Where this temperature is not 180° F. the longer time must be used for processing.

Cooling: Immediately after processing is completed cool cans as rapidly as possible to 100° F. This leaves enough heat in the cans to dry them and prevent rusting. When the cans are removed from the cooling water they should be tilted to drain off excess water and then should be stacked in a well-ventilated place until cold. Do not stack cans or place into cartons until they are cold and dry.

WAR FOOD ADMINISTRATION
OFFICE OF DISTRIBUTION
Washington 25, D.C.

August 1944

SUMMER SQUASH
(Crookneck, Scallop, Straightneck, and Zucchine)/1

Container: Use plain tin cans.

Quality of Product: Only young, tender squash should be used. Do not use any squash that has begun to mature.

Preparation: Wash thoroughly, cut off stems, and cut into 1/2 inch to 3/4 inch slices.

Filling: Pack loosely into cans to fill them. There should be as little delay as possible between slicing and filling. Fill cans completely with boiling hot water or brine.

Exhausting: Exhaust to a center can temperature of 150° to 160° F. The higher exhaust temperature is better if it can be obtained quickly.

Sealing: Seal cans immediately after removing from exhaust box, and place at once in the retort. Do not permit cans to cool before sealing and processing.

Processing: Process summer squash at 240° F., as follows:

No. 2 cans - 40 minutes

Cooling: Immediately after processing is completed, cool the cans as rapidly as possible to 100° F. This leaves enough heat in the cans to dry them and prevent rusting. When the cans are removed from the cooling water they should be tilted to drain off excess water, and they should then be stacked in a well-ventilated place until cold. Do not put cans in cartons until they are cold and dry.

/1 For mature squash see "Pumpkin and Squash".

WAR FOOD ADMINISTRATION
OFFICE OF DISTRIBUTION
Washington 25, D.C.

August 1944

SWEETPOTATOES IN SIRUP OR BRINE

Container: Use plain or R-enamel cans.

Quality of Product: Freshly dug sweetpotatoes are best for canning. Care should be taken not to bruise the potatoes as soft rot develops quickly. Sweetpotatoes should not be canned when the potato vines have been frosted.

Preparation: Soak potatoes in cold water if necessary to remove clinging soil. Scrub with brush or wash with a spray of water to remove all dirt. Grade for size to make precooking more uniform.

Heat in retort at 240° F. for 10 to 15 minutes, depending on the size of the potatoes. Peel sweetpotatoes as quickly as they can be handled after precooking to conserve heat and prevent discoloration. Canvas gloves may be used to permit handling the potatoes more quickly. Do not dip sweetpotatoes in water to cool them.

Filling: Pack sweetpotatoes closely into cans. Leave small potatoes whole but cut larger ones lengthwise in slices that will give uniform sizes. Fill cans to within 1/4 inch of tops. Add boiling sirup or brine to completely fill the cans.

Sirup: A 20 percent sirup may be used. Boil the sugar and water together for 5 minutes and remove any scum that forms on the top. Do not heat longer as this will concentrate the sirup more than is desirable, but heat to the boiling point just before using.

Brine: Use a 1.5 percent brine for sweetpotatoes and heat to boiling beforehand, or salt may be added to filled cans by using 1/2 teaspoon to each No. 2 can and 1 teaspoon to each No. 3 can; then fill cans completely with boiling water.

Exhausting: Exhaust sweetpotatoes to 170° to 180° F. The higher exhaust temperature is better if it can be reached quickly.

Sealing: Seal cans as soon as the exhaust temperature is reached. Do not permit cans to cool after exhausting and before processing.

Processing: Process sweetpotatoes at 240° F., as follows:

No. 2 cans - 45 minutes
No. 2½ cans - 50 minutes
No. 3 cans - 50 minutes

Cooling: Immediately after processing is completed cool the cans as rapidly as possible to 100° F. This leaves enough heat in the cans to dry them and prevent rusting. When the cans are removed from the cooling water they should be tilted to drain off excess water, and they should then be stacked in a well-ventilated place until cold. Do not put cans in cartons until they are cold and dry.

WAR FOOD ADMINISTRATION
OFFICE OF DISTRIBUTION
Washington 25, D.C.

August 1944

SWEETPOTATOES SOLID PACK

Container: Use R-enamel or plain tin cans.

Quality of Product: Use only freshly harvested sweetpotatoes, as those that have been allowed to stand long enough to become slightly shriveled are hard to peel satisfactorily.

Preparation: Wash sweetpotatoes thoroughly. Place in the retort basket and steam at 240° F. for 10 to 15 minutes to loosen the skins. The time of heating will depend on the size of the potatoes. Do not dip steamed potatoes in water but use heavy canvas gloves to handle them in peeling. It is desirable to complete the canning of sweetpotatoes quickly to retain as much heat as possible and to prevent discoloration. The rate of heat penetration into canned sweetpotatoes is very slow and they should be packed into cans as hot as possible. Small potatoes may be left whole but larger ones should be cut lengthwise in slices that will give uniform size.

Filling: Fill the hot sweetpotatoes into cans to within 1/8 inch of the tops. Pack tightly so as to leave no air space. If potatoes are not packed tightly into cans it will be necessary to add brine to fill the cans completely; however, the same processing time is not used for potatoes packed with brine.

Exhausting: The length of process depends on the initial temperature, and the higher the initial temperature is the shorter the process needed. Potatoes should be exhausted to a higher center temperature than the initial temperature desired to allow for cooling during sealing. An initial temperature of 150° F. is necessary.

Sealing: Seal cans immediately after removal from the exhaust box and place at once in the retort. Do not allow cans to cool before processing.

Processing: Process sweetpotatoes at 240° F., as follows:

	150° F. Initial Temperature	180° F. Initial Temperature
No. 2 cans	95 minutes	85 minutes
No. 2½ cans	110 minutes	95 minutes
No. 3 cans	110 minutes	95 minutes

Cooling: Immediately after processing is completed cool the cans as rapidly as possible to 100° F. This leaves enough heat in the cans to dry them and prevent rusting. When the cans are removed from the cold water they should be tilted to drain off excess water, and they should then be stacked in a well-ventilated place until cold. Do not put cans into cartons until they are cold and dry.

WAR FOOD ADMINISTRATION
OFFICE OF DISTRIBUTION
Washington 25, D.C.

August 1944

TOMATO JUICE

Container: Use plain tin or R-enamel cans. Tomato juice may develop a metallic flavor after storage in tin cans for several months. The flavor and color is retained better over a long period by the use of R-enamel cans.

Quality of Product: Tomatoes for juice should be fully ripe and sound. Vine-ripened tomatoes give the best flavor and color and may be left on the vines for a day or two longer than when used for canning. However, tomatoes that are overripe give a thin juice that is lacking in flavor. Imperfectly shaped tomatoes that do not give an attractive product when canned whole may be used for making juice. Broken, diseased, or inferior tomatoes should not be used since the flavor of mold or other spoilage is carried entirely through the tomatoes. The quality of the juice depends on the quality of the tomatoes used.

Preparation: Sort tomatoes to remove any that are green, sunburned, diseased, or otherwise defective. Wash carefully, changing the water often enough to thoroughly remove dirt and spray residues.

Preheating: Preheating of tomatoes before extraction of juice gives a better color, flavor, and consistency to the canned product. There is less separation in the canned juice when tomatoes are preheated. Best results are obtained if the tomatoes are heated slowly to 160° to 170° F. Press the tomatoes slowly through a sieve or pulper to separate the skins from the juice, using care to avoid inclusion of air as this will cause loss of color and vitamins. Heat juice to 195° to 200° F. Do not stir juice as this also will cause oxidation, which results in loss of color and vitamins.

Filling: Fill tomato juice into cans as soon as it has reached the desired temperature. Fill cans completely full. Add 1/2 teaspoon of salt to each No. 2 can and 1 teaspoon to each No. 3 can of juice.

Exhausting: It is not necessary to exhaust tomato juice if cans are sealed at 190° F.

Processing: Process tomato juice in boiling water (212° F.), as follows:

	Water-Cooled	Air-Cooled
No. 2 cans	30 minutes	20 minutes
No. 2½ cans	35 minutes	25 minutes
No. 3 cans	35 minutes	25 minutes

Cooling: Immediately after processing is completed, cool the cans as rapidly as possible to 100° F. This leaves enough heat in the cans to dry them and prevent rusting. When the cans are removed from the cooling water they should be tilted to drain off excess water, and they should then be stacked in a well-ventilated place until cold. Do not put cans in cartons until they are cold and dry.

WAR FOOD ADMINISTRATION
OFFICE OF DISTRIBUTION
Washington 25, D.C.

August 1944

TOMATOES (REVISED)

Container: Use plain tin cans; R-enamel may be used if desired to protect the color.

Quality of Product: Tomatoes for canning should be fully ripe but firm. Vine-ripened tomatoes give the best flavor and color. Smooth, regular shapes are more easily prepared and losses in preparing them are lower than for those of irregular shapes. Tomatoes should be handled in containers that give protection from crushing. Broken, moldy, or diseased tomatoes contaminate the hampers and add danger of spoilage in canning.

Preparation: Sort tomatoes and remove those that are green, overripe, moldy, wormy, sunburned, or otherwise defective. Wash carefully, changing water often enough to insure thorough removal of dirt and spray residues.

Scalding: Place clean tomatoes in blanching basket and dip them into boiling water for 1/2 to 1 minute, according to the ripeness of the tomatoes. Water under boiling temperature will cook tomatoes rather than loosen the skins. Dip the tomatoes into cold water, to stop the cooking, and to crack the skins in order to make peeling easier.

Peeling: Use a Smiley tomato knife or sharp-pointed peeling knife to remove cores. At the same time twist the tomato in the opposite direction to remove the skin. Remove green or sunburned spots.

Filling: Pack tomatoes into cans, pressing them close to give a well-filled can. Fill cans completely full. Do not add any water to tomatoes. Add salt, using 1/2 teaspoonful to each No. 2 can and 1 teaspoonful to each No. 3 can of tomatoes.

Exhausting: Exhaust tomatoes to a center can temperature of 140° F.

Sealing: Seal cans immediately after removal from exhaust box. Do not permit cans to cool before sealing and processing.

Processing: Process tomatoes in boiling water (212° F.), as follows:

	Water-Cooled	Air-Cooled
No. 2 cans	45 minutes	35 minutes
No. 2½ cans	55 minutes	45 minutes
No. 3 cans	55 minutes	45 minutes
No. 10 cans	90 minutes	70 minutes

Cooling: Immediately after processing is completed, cool the cans as rapidly as possible to 100° F. This leaves enough heat in the cans to dry them and prevent rusting. When the cans are removed from the cooling water they should be tilted to drain off excess water, and then should be stacked in a well-ventilated place until cold. Do not put cans in cartons until they are cold and dry.